

ECP/428/86

International
Marketing Information
Series



Country Market Survey

NEWARK PUBLIC LIBRARY

MAY 6 1986

U. S. GOVT. PURS.
DEPOSITORY 328

Electronic Components Production/Test Equipment

Germany

best copy available



U.S. DEPARTMENT OF COMMERCE
International Trade Administration

C61.9:

Germany

CMS/ECP/428/86, February 1986

CMS

German sales of electronic components production/test equipment are expected to more than double in all categories by 1987 (see table 1 and figure 1). This diversified market is rebounding after several years of slow growth in the early 1980's. Now that demand is rising for both passive and active components in the capital and consumer electronics sectors, local manufacturers are ready to upgrade and add to their production lines. About 60 percent of components are purchased by merchant producers (see table 2). In general, German electronic component makers use very high quality production equipment of advanced technological design. Wafer production equipment should lead the production/test apparatus market with 35-percent yearly growth, followed by automated assembly systems (26 percent), and testing devices (23-26 percent).

End Users

Production of electronic components declined from a high of \$1.7 billion in 1980 to \$1.3 billion in 1982, but recovered slightly in 1983 and is now forecast to reach almost \$2 billion in 1987. Only the wide diversification of German manufacturers kept them alive during this downturn. Dramatic growth is expected as venture capital pours into longer term investment projects, and as demand picks up for computer equipment, telecommunications systems, electronic office equipment, and consumer electronics.

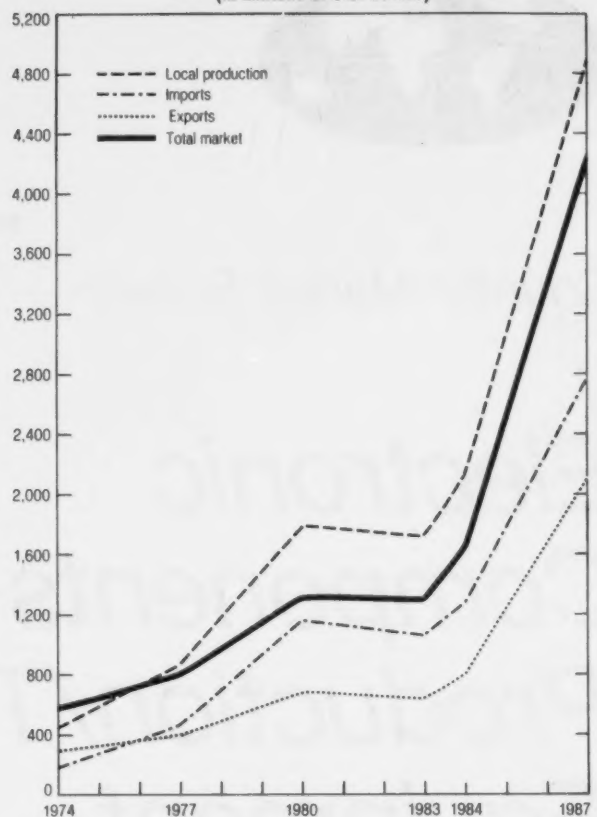
Some of the large conglomerates make components for their own use, but also offer their excess capacity on the open market (see table 3). Others produce entirely for other manufacturers, while subsidiaries of foreign companies produce components for both their parent and sister companies and the merchant market.

Although state-of-the-art components are traditionally purchased from American firms, local manufacturers are beginning to innovate. However, demand remains strong for low- and middle-technology components from producers of consumer electronics, certain office equipment, and in transportation equipment (see Tables 4a, 4b, and 4c).

Note: All values are given in U.S. dollars. Local currency is converted at the following exchange rates: US\$1=DM2.59 (1974), DM2.51 (1977), DM1.82 (1980), DM2.55 (1983), DM2.60 (1984), and DM2.20 (1987).

Source: "Market Research Profile on the Electronic Components Production and Test Equipment Market in West Germany," Tactical Marketing Limited, 73 New Bond Street, London W1Y 9DB, England, March 1985, prepared under contract to International Trade Administration, U.S. and Foreign Commercial Service (see Additional Information box).

Figure 1
Germany: The market for electronic components
production/test equipment 1974-87
(in millions of U.S. dollars)



Similarly, packaging varies with usage, cost, and design from plastic and ceramic (for in-line packaging) to eutectic banding and epoxy process (for the attachment of dies).

Siemens supplies nearly all German manufacturers with integrated circuits, discrete semiconductors, and passive components, and the company is much sought after as a buyer of equipment. Siemens has, using its considerable resources, recently been catching up technologically to Japanese and U.S. competitors through its 64K D-Rams (sold to IBM) and chip designs, licensed to a Silicon Valley maker. The firm has great faith in the future of componentry and has invested in new designs and techniques—specifically, memory chips with greater capacity and with regular structures and self-testing circuitry on the chip itself.

Telefunken Electric, a large subsidiary of AEG with an extremely broad product range, supplies its own group sister companies, the merchant market, and other manufacturers on a direct contract basis. The firm's semiconductor production is small but growing, although Telefunken generally supplies the lower and middle-volume ends of the market with

Table 1.—Germany: The market for electronic components production/test equipment, 1974-87
(in millions of U.S. dollars)

	1974	1977	1980	1983	1984	Projected 1987
Wafer fabrication equipment						
Production	58	119	331	319	385	909
Imports	51	76	136	121	202	568
Exports (less)	25	76	243	209	308	680
Total	84	119	224	231	279	797
Semiconductor assembly equipment						
Production	68	165	398	419	472	1,318
Imports	71	118	268	309	362	1,045
Exports (less)	21	100	337	277	225	978
Total	118	183	329	451	609	1,385
Passive and other components production equipment						
Production	143	241	518	536	586	1,375
Imports	99	117	159	109	164	280
Exports (less)	45	127	322	348	388	689
Total	197	231	355	297	362	966
Automatic test equipment						
Production	40	75	120	98	127	245
Imports	19	20	31	18	19	39
Exports (less)	22	38	60	48	74	115
Total	37	57	91	68	72	169
Logic analyzers						
Production	34	63	101	83	116	241
Imports	12	13	20	16	13	35
Exports (less)	20	30	53	40	65	95
Total	26	46	68	59	64	181
Environmental test equipment						
Production	34	52	101	89	134	255
Imports	13	14	21	16	13	36
Exports (less)	12	17	31	35	50	74
Total	35	49	91	70	97	217
Microprocessor development systems						
Production	30	48	87	70	142	223
Imports	14	16	24	20	17	45
Exports (less)	23	33	64	53	70	73
Total	21	31	47	37	89	195
Other component test equipment						
Production	42	105	129	103	151	309
Imports	17	17	27	23	16	43
Exports (less)	15	43	45	51	94	64
Total	44	79	111	75	73	288
Total market						
Production	449	868	1,785	1,718	2,113	4,875
Imports	296	391	687	632	806	2,091
Exports (less)	183	464	1,156	1,061	1,274	2,768
Total	562	795	1,316	1,289	1,645	4,198

Source: "Market Research Profile on the Electronic Components Production and Test Equipment Market in West Germany," prepared under contract for the International Trade Administration, U.S. and Foreign Commercial Service (see Additional Information box).

Table 2.—Germany: Purchases of components production/test equipment by end-user sector, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Merchant producers	802	786	1,002	2,561
Captive producers	408	400	509	1,300
Research and other	106	103	134	337
Total	1,316	1,289	1,645	4,198

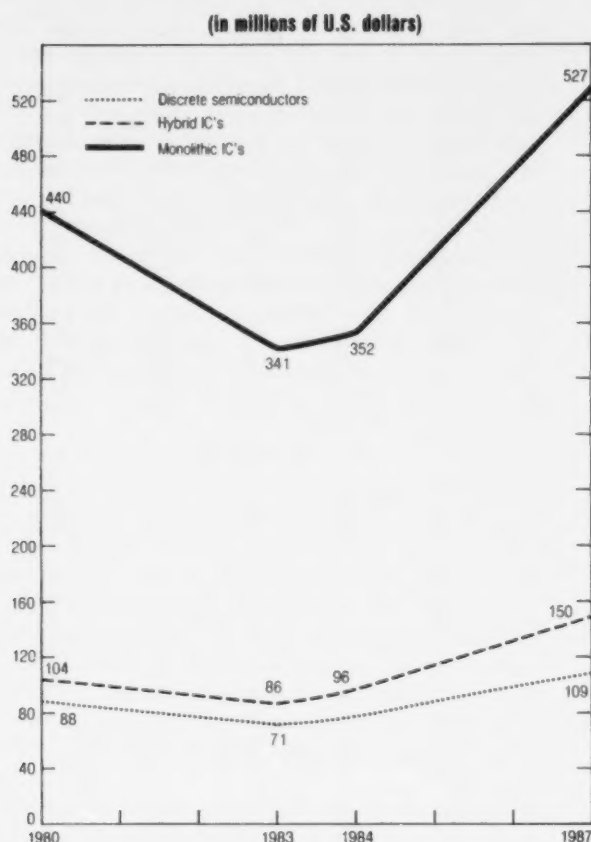
Source: International Trade Administration research report.

somewhat dated equipment. **Ditratherm**, another domestic semiconductor producer and a small sub-

sidary of Roederstein, specializes in components.

Manufacturers of components most often use flexible manufacturing systems (FMS), frequently combined with robotic assembly work. In production/test equipment, fluidics are still significant, but computerized devices and systems should continue to dominate. Production/test equipment generally wears out in 5 to 7 years. Makers gear their products toward outlasting this and their technological cycle. While major end users do not purchase used goods, small, less technologically advanced companies purchase such items on pricing grounds.

Figure 2
Germany: Local semiconductor production, 1980-87



The German Government supports its electronics industry with buy-national edicts for official orders

of capital equipment, research and development subsidies equal to approximately 18 percent of the national R & D budget, and industrial training programs. Recent stagnation in the components segment, combined with the sizable imports bill, has increased pressure for additional research. In March 1984, \$1.2 billion was proposed for high-tech research over 4 years, with significant portions earmarked for microchip memory technology and advanced computer systems.

Semiconductor manufacturers, making up less than 10 percent of the total number of component makers and accounting for close to 40 percent of sales, are responsible for 92 percent of R & D, which reflects the rapidly advancing technology in semiconductors. Certain major domestic manufacturers commit large sums to research. In addition to \$192 million for its 1 megabit D-RAM, Siemens, the biggest R & D spender, invests in IC's, semiconductor memories, rectifiers, laser diodes, and thermistors. Roederstein is innovative in capacitors, Quarzkeramik and Kristall Verarbeitung in crystal products, Hartung in optoelectronics, and Eurosil in gate arrays. All the multinationals put effort into innovation and product perfection. Current weaknesses appear to be in 16- and 12-bit micro circuitry, in LS/TTL and CMOS technology, and in optoelectronics and microwave componentry.

Production of **passive components** is forecast to rise from \$600 million in 1984 to \$700 million in 1987. In general, the standard of quality is high. Fastest growth is anticipated in output of multilayer PC boards, switches, capacitors, and connectors.

Table 3.—Germany: Economic indicators of major end users, 1983

	Employees		Factories		Production		Investment			Types of components produced
	Domestic	Offshore	Domestic	Offshore	All comp.	Semicdr.	Capital	Prod./test	R & D	
								equipment	expenditure	
							(in millions of U.S. dollars)			
Siemens	19,000	NA	11	NA	317	30%	9.2	2.1	3.4	IC's, microprocessors, discrete SC's, passives
Valvo	3,000	—	2	—	117	22%	11.0	3.4	2.7	Semiconductors, passives, audio
Telefunken	2,000	—	2	—	151	23%	8.7	2.3	1.4	Optoelectronics, IC's, transistors, diodes, logic, passives
Motorola	150	—	1	—	NA	62%	NA	NA	NA	Discrete semiconductors, IC's, bipolar, digital, microsystems
Ditratherm	440	—	3	—	120	34%	4.2	1.7	0.3	IC's, microcomputers, memories, discrete SC's, opoelectronics
Thomson CSF Bauelemente ...	400	1,760	1	5	91	29%	3.6	0.9	1.3	Semiconductors, microcomputers, tubes, passives

Source: International Trade Administration research report.

Table 4a.—Germany: Production of semiconductors, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Discrete semiconductors	104	86	96	150
Optoelectronic devices	13	12	13	27
Bipolar IC's	137	115	123	250
Hybrid IC's	88	71	77	109
MOS logic	165	114	113	136
MOS memory	138	112	116	141
Total	645	510	538	813

Source: International Trade Administration research report.

Table 4b.—Germany: Semiconductor manufacturing profile, 1983-84
(in percentages)

	1983	1984
Wafer size		
100 mm	11	10
125 mm	15	20
150 mm	59	40
larger than 150 mm	15	30
	100	100
Level of integration		
Discrete	18	15
ICs	26	28
SSI/MSI (under 100 gates/chip)	22	16
LSI (100-998 gates/chip)	20	26
VLSI (1,000 or same gates/chip)	14	15
	100	100
Process technology		
Bipolar	30	25
NMOS	40	35
CMOS	30	40
	100	100
Packaged technology		
Dual in-line packaging (DIP)		
Plastic	50	50
Ceramic	35	30
Other	15	20
	100	100
Die attachment		
Eutectic bonding	38	45
Epoxy	41	40
Other	21	15
	100	100
Bonding wire		
Aluminum	85	80
Gold	5	10
Other	10	10
	100	100
Number of pins/grid (PGA)		
Below 20	48	40
20-40	40	50
Over 40	12	10
	100	100

Source: International Trade Administration research report.

Competitive Assessment

Despite substantial local production of electronic components production/test equipment, imports account for almost half the market. U.S. firms have led foreign suppliers in every product category since at

Table 4c.—Germany: Semiconductor testing profile, 1983

Production stage	Acceptable yield (%)
Microolithography	98
Etch and strip	96
Ion implantation/diffusion	95
Deposition	95
Assembly	98

Source: International Trade Administration research report.

least 1980 (see table 5). Companies based in Switzerland and the Netherlands command sizable shares of the market, followed at some distance by Japanese vendors.

Domestic suppliers.—Output of the more than 200 German electronic components production/test equipment manufacturers topped \$2 billion in 1984. The five largest firms account for nearly half of production (see table 6 and list of Leading Suppliers; the research report also lists pertinent information about the major manufacturers). Laboratory and industrial instrumentation makers have long been solidly established in Germany. Their worldwide reputation for quality has carried over to the components production/test equipment and materials sector and also applies to the more than 40 small, newly set up producers of digital, computer-driven instrumentation.

Domestic companies make the entire spectrum of production and test equipment. Their forte, however, is not so much sophistication as rugged construction and a considerable degree of reliability in the most hazardous of factory conditions. This, along with timely deliveries and good aftersales support, helps overcome higher than world market prices and a technological gap with the United States.

Exports are projected to increase sharply by 1987 (see table 7). While France is the main receiver of German production/test equipment, the United States should remain second overall. Expected to decline as local technology improves, reexports could total as much as 12-14 percent of imports, mostly through multinationals such as Hewlett-Packard and Perkin-Elmer.

U.S. suppliers.—Advanced American technology and reliability, backed by global experience and attractive presentation, make production/test equipment and materials from the United States extremely desirable. U.S. suppliers should find opportunities in every product category through the decade, with particular demand for the following items:

- Automatic devices for pin and probe insertion
- In-circuit function testers
- VLSI test systems
- PCB testers
- Continuity testers
- Annealing furnaces
- CAD/CAE production and design systems, especially in gate array technology
- Flow soldering equipment

Table 5.—Germany: Imports of components
production/test equipment, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987				
Wafer fabrication equipment					France	3	2	1
United States	37	38	52	160	United Kingdom	3	1	1
Netherlands	23	18	25		Netherlands	2	2	1
France	13	11	16		Others		1	
Japan	12	12	14		Total	21	16	13
United Kingdom	13	10	13		Microprocessor development systems			
Others	38	32	82		United States	8	7	6
Total	136	121	202	568	Switzerland	4	3	2
Semiconductor assembly equipment					France	3	3	2
United States	67	50	87	293	Japan	3	2	2
Switzerland	34	41	48		United Kingdom	2	2	1
Japan	15	17	25		Others	4	3	4
Netherlands	16	18	22		Total	24	20	17
United Kingdom	16	18	18		Other component test equipment			
Others	120	165	162		United States	10	15	9
Total	268	309	362	1,045	Netherlands	6	2	2
Automatic test equipment					Switzerland	6	2	2
United States	20	10	9	21	United Kingdom	2	1	1
Switzerland	3	2	2		France	2	1	1
United Kingdom	2	1	2		Others	1	2	1
Netherlands	2	1	2		Total	27	23	16
France	1	1	2		Passive and other components production equipment			
Others	3	3	2		United States	45	28	44
Total	31	18	19	39	Switzerland	21	14	20
Logic analyzers					Netherlands	21	13	18
United States	7	8	7	16	Japan	16	12	15
Switzerland	4	3	3		United Kingdom	17	8	10
United Kingdom	3	2	1		Others	39	34	57
Netherlands	3	2	1		Total	159	109	164
Italy	2	1	1		Total imports			
Others	2	—	—		United States	203	165	222
Total	21	16	13	35	Netherlands	87	88	116
Environmental test equipment					Switzerland	90	91	113
United States	9	8	7	15	Japan	47	53	57
Switzerland	4	2	3		United Kingdom	60	58	49
					Others	200	177	249
					Total	687	632	806
								2,091

Source: International Trade Administration research report.

Table 6.—Germany: Major domestic manufacturers of components production/test equipment, 1983
(in millions of U.S. dollars)

		Production			
	Employees (in-country)	Semiconductor production/ test equipment	All	Exports	Capital investment
Hartman u. Braun	5,874	57	182	79	18.2
Rohde u. Schwarz	2,200	61	151	73	11.4
Siemens	1,780	40	136	86	15.1
Robt. Bosch	902	12	83	39	6.4
Fischer u. Porter	764	23	55	19	3.6

Source: International Trade Administration research report.

- Logic analysers
- Wafer-making devices of all types
- High-resolution microscopy equipment
- Optical inspection devices
- Environmental test equipment

U.S. know-how should be particularly advantageous in the semiconductor field, as well as in assembly equipment and other areas (see Best Sales

Prospects). American companies produce either through joint ventures with established firms, licensed manufacture by another firm, in-market manufacture by a wholly owned subsidiary, or in-market sales by a wholly owned subsidiary.

U.S. vendors are expected to comprise almost one-third of the production/test equipment import market in 1990. To achieve this level in the face of

Leading Suppliers

Company	Country of mfr.	Products	Company	Country of mfr.	Products
Wafer fabrication equipment			Passive and other components production		
AFS Mikroelektronik	Germany	Wafer saws	AFS Mikroelektronik	Germany	Microcomponent autoinserters
ASM	Germany	Wafer saws	BEST-Ventil	Germany	Connecting elements
BPI	Germany	Wafer carriers	Bruckner	Germany	Crimpers
Diamant	Germany	Wafer saws	Einhart-Dyna	Germany	Microcomponent autoinserters
Karl Suss	Germany	Wafer probers	Fohrenbach	Germany	Assembly centers
Leitz	Germany	Wafer production equipment	Geissler	Germany	Assembly stations
Macrotron	Germany	Wafer preparation equipment	Grassmann	Germany	Interconnecting equipment
Sieghard Schiller	Germany	Wafer production equipment	Grael	Germany	Assembly centers
Syntel GmbH	Germany	Wafer production equipment	Gustav Wirz	Germany	Microcomponent autoinserters
Berney SA	Switzerland	Wafer saws	HP Heeb	Germany	Inserters
GCA International GmbH	USA	Wafer production equipment	Knurr	Germany	Connecting elements
Gustav Wirz AG	Switzerland	Wafer preparation equipment	Lemmer	Germany	Inserters
Kulicke & Soffa AG	Switzerland	Wafer preparation equipment	MIMOT	Germany	Assembly centers
Loadpoint	UK	Wafer dicers	Messma	Germany	Assembly centers
Rotec Corporation	USA	Wafer saws	Microtonic	Germany	Microcomponent autoinserters
Semas AG	Switzerland	Wafer preparation equipment	Molex GmbH	Germany	Pin inserters
Teledyne Tac	USA	Wafer probers	Oswald Boll	Germany	Assembly stations
Semiconductor assembly equipment			Peter Jordan	Germany	Inserters
3X GmbH	Germany	Laser trimmers	Pico	Germany	IC handling equipment
ASM	Germany	Film deposition equipment	Polytronik	Germany	Assembly stations
ATV Technologie	Germany	Thick-film furnaces	Royonic GmbH	Germany	Inserters
Bio-Rad	Germany	Deposition equipment	Seitz & Hohnerlein GmbH	Germany	Assembly centers
CJT Vacuum	Germany	Deposition equipment	Sekuria GmbH	Germany	Assembly centers
ET Electrotech	Germany	Deposition equipment	Siemens AG	Germany	Assembly centers
Helmut Seier	Germany	Thick-film furnaces	Streckfuss	Germany	Pin inserters
Hoechst	Germany	Plasma etchers	TEA	Germany	Assembly equipment
Intertherm GmbH	Germany	Plasma etchers	Walter Kundler	Germany	Assembly centers
Karl Suss	Germany	Film deposition equipment	Weber Werkzeug	Germany	IC inserters
Ke-TeX	Germany	Substrates	Weld-Equip	Germany	IC pullers
Laser Optromic GmbH	Germany	Laser trimmers	Zehntel GmbH	Germany	Assembly centers
Leybold-Heraeus	Germany	Thin-film equipment	Altoflex	France	Interconnecting equipment
Linn Elektronik	Germany	Thick-film furnaces	Arcotronics SpA	Italy	Assembly centers
Macrotron	Germany	Film deposition equipment	Automelec SA	Switzerland	Assembly centers
Semas	Germany	Coring plants	Autosplice	USA	Microcomponent autoinserters
Sillner Maschinenbau	Germany	Laser trimmers	Comil	France	Assembly stations
Advanced Crystal Sciences	USA	Film deposition equipment	Cooper Group	UK	IC pullers
Airco Temescal BV	Netherlands	Film deposition equipment	Covatec SA	Switzerland	Assembly equipment
BTU/Bruce	USA/UK	Thick-film furnaces	Covatec SA	Switzerland	Fine welders
Balzer	Finland	Thin-film equipment	Dage Precima	UK	Assembly centers
CIT-Alcatel	France	Thin-film equipment	Du Pont	Belgium/USA	Microcomponent autoinserters
Cadillac Plastic GmbH	USA	Substrates	Excellon Europe GmbH	USA	Microcomponent autoinserters
Cladan Inc.	USA	Thick-film furnaces	Farco	Switzerland	Assembly centers
De Haart Inc.	USA	Thick-film furnaces	Fuji Machine Corp.	Japan	Microcomponent autoinserters
Delvotec	Switzerland	Automatic bonders	Granus	Philips NV	Connecting elements
Dickfilm System AG	Switzerland	Hybrid manipulators	Intercord	Switzerland	Assembly equipment
Esec SA	Switzerland	Automatic bonders	Iteco	Italy	Assembly centers
Gretag AG	Switzerland	Laser trimmers	Kontakt-systeme AG	Switzerland	Assembly centers
Hunt Chemical BV	Netherlands	Plasma etchers	Lasag AG	Switzerland	Fine welders
Kohlmann	France	Plasma etchers	Meto-Fer AG	Switzerland	Assembly centers
Kulicke & Soffa AG	Switzerland	Automatic bonders	National Panasonic	Japan	Microcomponent autoinserters
Orthodyne Inc.	USA	Automatic bonders	Nitto Kogyo	Japan	Microcomponent autoinserters
Perkins-Elmer	USA	Thin-film equipment			
Piezo-Ceram	France	Thin-film equipment			
Plasma Technology	UK	Plasma etchers			
Research Inc.	USA	Epitaxial reactors			
Teradyne GmbH	USA	Laser trimmers			
Vacotec SA	Switzerland	Deposition equipment			
Varian GmbH	Switzerland	S/C assembly equipment			

Leading Suppliers — Continued

Company	Country of mfr.	Products	Company	Country of mfr.	Products
Proselec SA	Switzerland	Assembly stations	VIP Microelectronics	Germany	Heating testing equipment
Race Electronics	UK	Assembly stations	WC Heraeus GmbH	Germany	Test chambers
Schlatter AG	Switzerland	Interconnecting equipment	WEGO Messtechnik	Germany	Automatic test equipment
Schlup	Switzerland	Assembly centers	Wegu GmbH	Germany	PCB testers
Sormel	France	Assembly equipment	Weiss Technik GmbH	Germany	Test chambers
Sormel	USA	IC handling equipment	Zehntel	Germany	In-circuit testers
Techmasheexport	USSR	IC handling equipment	Zwick GmbH	Germany	Testing equipment
Unilab-Datamation	USA	Assembly centers	2A Srl	Italy	Testing equipment
Valvo	Philips NV	Microcomponent autoinserters	Almacoa AG	Switzerland	Testing devices
Vogt AG	Switzerland	Connecting elements, pin inserters	Altoflex	France	Monitoring equipment
Winex AB	Sweden	Inserters	Analog Devices	USA	Automatic test equipment
Wuthrich AG	Switzerland	Pin inserters	Arcotronics SpA	Italy	Testing equipment
Components test equipment			Bendix	USA	Automatic test equipment
3x GmbH	Germany	Automatic test equipment	Christopher Group	USA	Testing devices
ATE Systems GmbH	Germany	Logic testers	Circuit Engineering	UK	Testing equipment
BPI	Germany	Measuring equipment	Cooper Industries	UK/USA	Automatic test equipment
Bio Rad GmbH	Germany	Testing devices	Darragon SA	France	Testing equipment
Brabender Realtest GmbH	Germany	Test chambers	Electronic Systems & Programming Inc.	USA	In-circuit testers
Deltest Systems GmbH	Germany	Automatic test equipment	Everett/Charles	USA	In-circuit testers
Elabo	Germany	Automatic test equipment	Excellon Europa GmbH	USA	PCB testers
Heiden	Germany	Logic analysers	Fluke D'land	USA	Logic testers
Hermann Rapp	Germany	Automatic test equipment	Forwessun	UK	In-circuit testers
Ingun Prufbau	Germany	Automatic test equipment	GenRad	USA	Testing devices, logic testers
Instrumatic	Germany	Automatic test equipment	Gyrex Corporation	USA	Measuring equipment
Itronic-Fuchs	Germany	Automatic test equipment	Hewlett-Packard	USA	Logic analysers
KTS Electronic GmbH	Germany	In-circuit testers	Iwatsu Electronic	Japan	Logic analysers
Kommer	Germany	Testing devices	Kali Chemie AG	Switzerland	Heat testing equipment
Lang Elektronik	Germany	Measuring equipment	Keithley Instruments	USA	Automatic test equipment
Luther & Maelzer	Germany	PCB testers	Kulicke & Soffa AG	Switzerland	Testing equipment
Macrotron GmbH	Germany	Monitoring equipment	Marconi Messtechnik	UK	Testing devices
Mania Geratebau	Germany	PCB testers	NH/Powerest	USA	Automatic test equipment
Minitron	Germany	IC test sockets	Nicolet GmbH	France	Measuring equipment
Oswald Boll	Germany	PCB testers	Nicolet Instrument	France	Logic analysers
Pema GmbH	Germany	Testing equipment	Pylon Co., Inc.	USA	In-circuit testers
RMS	Germany	Testing equipment	Telepacific	USA	Testing equipment, automatic test equipment
Robt. Bosch GmbH	Germany	PCB testers	Temtronic Corporation	USA	Measuring equipment
Rohde & Schwarz	Germany	Monitoring equipment, automatic test equipment	Teradyne GmbH	USA	Logic testers
Siemens AG	Germany	Testing devices	Vanwell Datasystems	UK	Automatic test equipment
Syntel GmbH	Germany	Testing equipment	Vero	UK	Automatic test equipment
VG Instruments GmbH	Germany	Measuring equipment	Wayne Kerr GmbH	USA	PCB testers

heavy domestic competition, companies must apply aggressive marketing techniques (such as active advertising campaigns, maximum product exposure, and facilities to cater to customer queries) and assure that their products fit the market precisely. Trade journals and shows, as well as distributors' showrooms and training sessions, are recommended. The research report lists trade media, gives details of trade shows, and provides addresses for several relevant trade organizations.

Third-country suppliers.—As many as 50 European and Japanese companies also supply and influence Germany's components production/test equip-

ment market. Brown Boveri (Switzerland), Nicolet (France), AME (Norway), Auxitrol (Netherlands), and Marconi, J.J. Lloyd, Crompton-Hawker Siddeley, and Rank Taylor Hobson from the United Kingdom successfully manufacture and sell high-quality and reasonably priced equipment.

Both the Netherlands and Italy should improve their shares of the components production/test equipment import market by 1990, because of price, selective product strengths, and in-market licensing. France should also gain as an innovator and style-setter, while the United Kingdom and Switzerland are expected to lose shares because of pricing and

Table 7.—Germany: Exports of components
production/test equipment, 1980-87
(in millions of U.S. dollars)

	1980	1983	1984	Projected 1987
Wafer fabrication equipment				
United States	10	9	14	25
France	26	22	30	
United Kingdom	14	13	21	
Italy	17	14	20	
Netherlands	15	13	15	
Others	161	138	208	
Total	243	209	308	680
Semiconductor assembly equipment				
United States	8	7	5	59
France	43	36	22	
United Kingdom	27	23	18	
Netherlands	16	14	12	
Italy	8	7	12	
Others	235	190	156	
Total	337	277	225	978
Automatic test equipment				
United States	12	9	11	35
France	8	7	12	
Italy	6	5	11	
Netherlands	4	4	7	
United Kingdom	3	4	7	
Others	27	19	26	
Total	60	48	74	115
Logic analyzers				
United States	5	8	10	36
France	7	5	10	
United Kingdom	4	4	8	
Italy	3	3	7	
Netherlands	3	4	7	
Others	31	16	23	
Total	53	40	65	95
Environmental test equipment				
United States	3	3	5	7
France	4	6	9	
United Kingdom	3	4	8	
Italy	3	3	7	
Netherlands	2	3	6	
Others	17	16	15	
Total	32	35	50	74
Microprocessor development systems				
United States	6	5	7	7
France	8	9	15	
Italy	4	4	10	
United Kingdom	3	4	5	
Netherlands	4	4	4	
Others	39	27	29	
Total	64	53	70	73

Other component test equipment				
United States	10	11	22	15
France	6	7	13	
Italy	4	5	9	
Netherlands	3	4	7	
United Kingdom	3	4	6	
Others	19	20	36	
Total	45	51	93	64
Passive and other component production equipment				
United States	37	33	39	66
France	52	38	43	
Netherlands	26	21	26	
Italy	33	31	16	
United Kingdom	14	10	15	
Others	160	215	250	
Total	322	348	389	689
Total exports				
United States	92	86	112	250
France	154	129	154	
Italy	79	73	90	
United Kingdom	71	65	89	
Netherlands	74	67	84	
Others	686	641	745	
Total	1,156	1,061	1,274	2,768

Source: International Trade Administration research report.

Best Sales Prospects

Product	Potential buyers
Wafer fabrication equipment	Telefunken/Siemens/ Motorola/ITT/Thomson CSF/Valvo
Semiconductor assembly equipment	Telefunken/Siemens/ Valvo/Motorola/ITT/ Texas/Thomson
Passive and other components production equipment	Telefunken/Siemens/ Blaupunkt/Brown/Boveri/ Cannon/Elco/Eurosil/ Gelma/ITT/Motorola Murata/Ditratherm/ Roederstein/Siegert/ Thomson/Valvo
Components test equipment	Telefunken/Siemens/ Blaupunkt/Brown/Boveri/ Cannon/Elco/Eurosil/ Gelma/ITT/Motorola Murata/Ditratherm/ Roederstein/Siegert/ Thomson/Valvo

Source: International Trade Administration research report.

other considerations. A doubling of Japan's share is expected, as its technology and marketing secure new clients.

Business Practices

An effective distribution network of importers and agents already exists throughout Germany, so new-to-market suppliers will have no trouble locating

conscientious and experienced distributors. (A list of importers and agents is given in the fall research report.) Domestic manufacturers usually sell directly to the end user, although some multipurpose products may be handled by dealers.

Price and terms of sale are considered the least significant aspects of purchasing by major end users, which instead take into account suitability for the task, ruggedness of design, advanced technology,

reliability and freedom from downtime, manufacturer's reputation, timely delivery, aftersales support, and ease of operator training.

Duties of up to 11.8 percent are levied on products from the United States and other non-EEC countries. A value-added tax is applied to all goods, foreign and domestic, at each sales point. Government agencies commonly receive a 10-percent discount.

Germany requires products to meet certain standards of quality and safety and to have certificates of origin. See the research report for details on standards and regulations, as well as tariffs, and lists of local trade publications, associations and exhibitions. Electrical supply is 220 volts for domestic use and 380 volts for industry. All weights and measures should be in metric terms and written material in German.

Germany: Basic Economic Indicators

Population:	61.2 million (1984)	Imports c.i.f.:	\$153 billion (1984)
GDP:	\$616,415 million (1982)	U.S. share:	7.2%
Contributions to GDP:	Services 57% (1984)	Major trading partners:	France, Netherlands, Italy, Belgium-Luxembourg, OPEC United Kingdom, United States
	Industry 40%		
	Agriculture 3%	Exchange rate:	DM 2,8456=US\$1 (1984)
Average annual growth rates:	Services 5% (1984)	Fiscal year	Calendar year
	Industry 5%	Current account balance:	+\$6,248 million (1984)
	Agriculture 3%	International reserves:	\$29.5 million (1984)
Per capita income:	\$10,076 (1984)	Labor force:	25.3 million (1984)
Inflation rate:	2.4% (1984)	Unemployment:	9.1% (1984)
Exports f.o.b.:	\$172 billion (1984)	Average hourly wage:	\$5.58 (1984)
U.S. share:	9.6%		

Useful Addresses

Embassies

American Embassy
Commercial Section
Delchmannsaue
5300 Bonn 2
Bonn
tf: 339 33 90
tx: 885452

Embassy of the Federal Republic of Germany
4645 Reservoir Road, N.W.
Washington, DC 20007
tf: 298-4000

American Chamber of Commerce

Kurfuerstendamm 114
1000 Berlin 30
tf: 24 26 46

Electronics trade association

Zentralverband der Elektrotechnischen Industrie
e.V. (ZVEI)
6000 Frankfurt-am-Main 70
Stresemannallee 19
tf: 11 63 02
tx: 411035

Licensing agency

VDE Pruefstelle
(Electronics Testing Service for DEK/VDE/DIN)
6050 Offenbach
Merianstr. 28
tf: 118 30 61
tx: 4152796

Technical standards

Deutsche Elektrotechnische Kommission
6000 Frankfurt-am-Main 70
Stresemannallee 15
tf: 116 30 81
tx: 412871

Additional Information

The project officer responsible for Country Market Surveys on electronic components production/test equipment is:

Hayden M. Wetzel
ITA/EPS, Room H2012
U.S. Department of Commerce
Washington, DC 20230
Telephone: (202) 377-4493

Current information on marketing conditions in Germany is available from:

Federal Republic of Germany Desk Officer
ITA/IEP, Room H3036
U.S. Department of Commerce
Washington, DC 20230
Telephone: (202) 377-2841

Department-sponsored trade shows and other promotional vehicles for electronic components production/test equipment are handled by:

Joseph Burke
ITA/TD, Room H4412
U.S. Department of Commerce
Washington, DC 20230
Telephone: (202) 377-5014

To order CMS and other research reports, and for a free copy of the newest catalog of EPS reports, please write to:

International Market Research Services
ITA/EPS, Room H1324
P.O. Box 14207
U.S. Department of Commerce
Washington, DC 20044
Telephone: (202)377-2665

